



June 7, 2006

VIA ELECTRONIC MAIL & U.S. MAIL

Danny McClure
Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114
Email to: dmcclure@waterboards.ca.gov

**RE: DOW AGROSCIENCES COMMENTS ON THE PUBLIC REVIEW DRAFT OF THE
SACRAMENTO-SAN JOAQUIN DELTA DIAZINON AND CHLORYPRIFOS BASIN
PLAN AMENDMENT**

Dear Mr. McClure:

Pursuant to the State Water Board notice of April 26, 2006, Dow AgroSciences ("DAS") submits the attached supplemental comments relative to the Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin Basin Plans for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento-San Joaquin Delta. These comments supplement previous DAS submittals and supplement the peer review, each of which assert the need to include a threshold to apply the additivity formula to the TMDL.

There appears to be no scientific support for applying additivity at all concentrations, therefore, for the additivity formula to be scientifically defensible, a threshold for its application needs to be included.

For more information or questions, please contact Dr. Nick Poletika at Dow AgroSciences at (317) 337-3476, or myself at (916) 325-4000.

Respectfully submitted,

/s/ William J. Thomas

WILLIAM J. THOMAS, on behalf of
BRYAN L. STUART, Ph.D., Government Relations Manager
Dow AgroSciences LLC

Attachment

cc: Bryan L. Stuart, Ph.D.

ATTACHMENT

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Dow AgroSciences Comments on Amendments to the Water Quality Control Plan For
the Sacramento River and San Joaquin River Basins For The Control of Diazinon and
Chlorpyrifos Runoff into the Sacramento-San Joaquin Delta

April 2006 Public Review Draft

Nick Poletika, Ph.D.

2.1 Watershed Areas to Be Considered

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“For the purposes of this report, the term “Delta watershed” refers to the area outlined in Figure 2.1 which includes the Legal Delta, as defined in Section 12220 of the California Water Code, as well as the areas that drain directly to the Legal Delta. Not included in the Delta watershed are the areas that drain to upland reservoirs or the areas that drain to the Sacramento or San Joaquin Rivers upstream of the Legal Delta Boundaries. Diazinon and chlorpyrifos sources that discharge to the Sacramento and San Joaquin Rivers upstream of the Legal Delta are addressed in separate Basin Plan Amendments for those waterbodies (CRWQCB-CVR Resolutions R5-2003-0148 and R5-2005-0138). The Western extent of the Delta watershed corresponds to the boundary between Regional Water Boards 2 and 5. The extent of the Delta watershed was defined using Calwater v. 2.2.1 (CIWMC, 1999) watershed boundaries.”

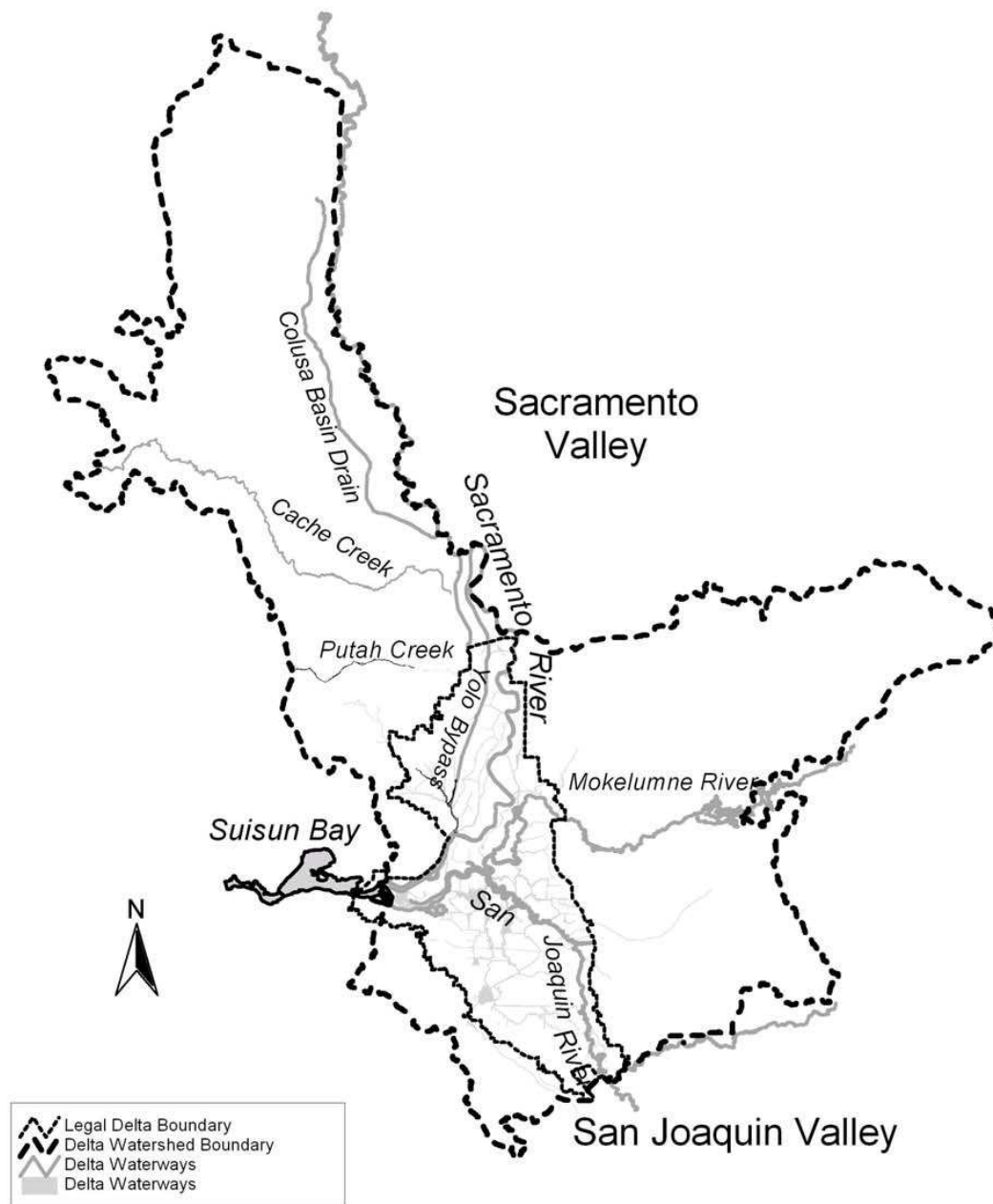


Figure 2.1. The Delta Watershed

Figure 2.1 is copied from the draft report.

Board Staff has elected to expand the 303(d)-listed Delta Waterways to a much larger area of proposed action (Figure 1) without providing evidence that this is necessary to protect water quality. Furthermore, Appendix A cites disclaimers from the providers of the dataset used to delineate the boundary that the dataset is hydrologically incorrect, and therefore it cannot be used with confidence to determine hydrologic connectivity. The proposed definition of the Delta area appears to be unsupportable for the purposes of this report.

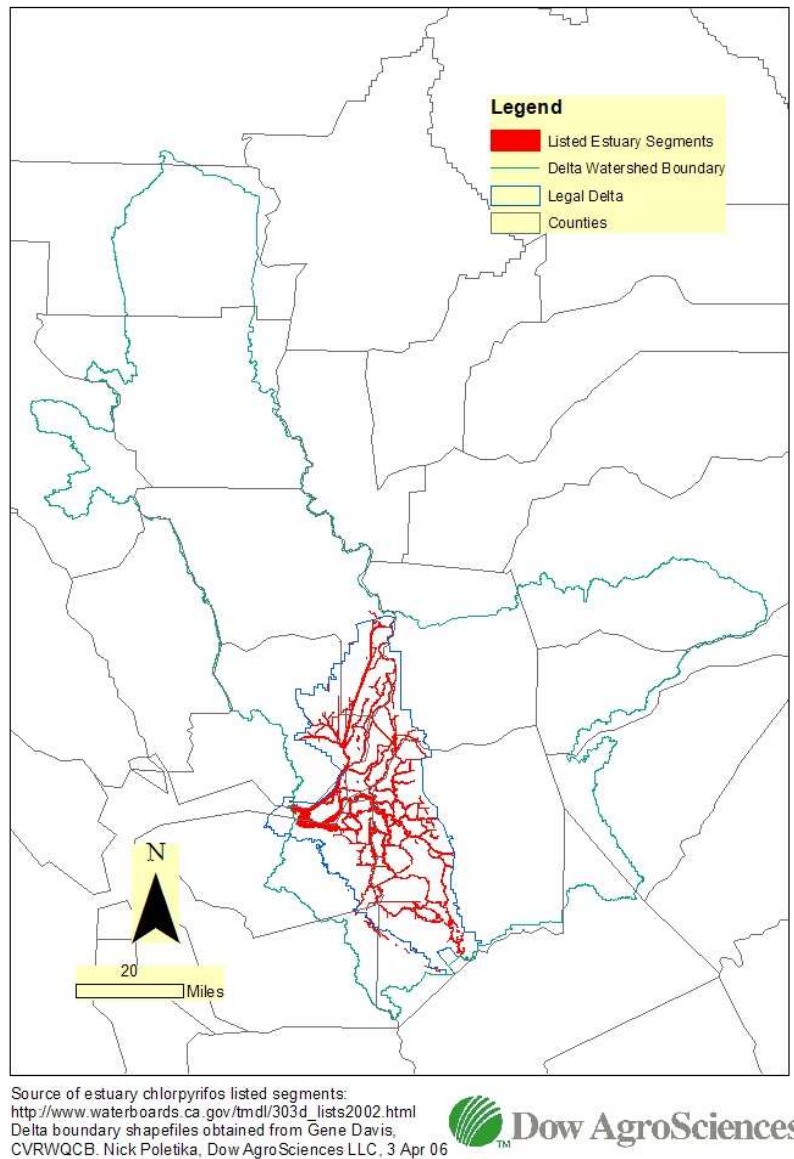


Figure 1. Comparison of listed estuary segments, the Legal Delta, and the proposed Delta watershed boundary.

2.3.3 Diazinon and Chlorpyrifos in Surface Water in the Delta Watershed

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“As shown in table 2.12, chlorpyrifos concentrations tend to be highest in back sloughs, Delta island drains, and small upland drainages and lower in the main river inputs to the Delta or the main channels of the Delta.”

This suggests sources in the Delta are local in nature, and attention should be paid to the area within the legal definition of the Delta, not the hydrologically incorrect “Delta watershed boundary” (Figure 1). In fact, the only 303(d) listings of Delta waterways for chlorpyrifos occur nearly exclusively within the legal definition of the Delta, and this huge area of listed impairment was supported by very sparse monitoring data. There appears to be no justification for expanding this action to include a larger area. DAS therefore requests that the area to be included in the Water Quality Plan amendments incorporate only the Legal Delta region containing the listed segments. Such a change will allow stakeholders to focus on local areas contributing chlorpyrifos movement to impaired waterways, which Board Staff acknowledges are the most significant sources. Expanding the area of concern to the proposed Delta watershed boundary will result in increased burden on limited stakeholder resources to take actions to improve water quality in more remote use sites with a small likelihood of significant benefit to the impaired segments.

5.1.8 Additive Toxicity

DAS has previously commented in the context of the San Joaquin River TMDL that using numeric criteria set for individual chemicals in the Basin Plan additivity formula is not scientifically defensible. The cited publications supporting the additivity effect model for acetyl-cholinesterase-inhibiting compounds used acute toxicity values for individual species, not criteria derived from USEPA methodology incorporating species sensitivity distributions. There is no evidence to suggest the additivity assumption applies to chronic effects, as the endpoints for OP insecticides differ.^{1,2} The CDFG criteria utilized differing taxonomic groups for diazinon and chlorpyrifos in the ranked Genus Mean Acute Values, calling into question the use of the values in an additivity policy. Final acute and chronic values resulting from the USEPA method incorporate a safety factor, which renders a formula based on the sum of such values meaningless as an expression of actual toxicity to aquatic life.

Additionally, as stated in the peer review comments of Dr. Alan Felsot,³ the very protective CDFG criteria require action to be taken at levels lower than those where

¹ Barron, M.G. and Woodburn, K.B. 1995. Ecotoxicology of chlorpyrifos. *Rev Environ Contam Toxicol* 144:1-93.

² Giddings, J.M., Hall, Jr, L.W., Solomon, K.R. 2000. Ecological risks of diazinon from agricultural use in the Sacramento-San Joaquin River basins, California. *Risk Anal* 20:545-570.

³ Felsot, A.S. 2006. Peer Review and Analysis of “Amendments to the Water Quality Control Plan For the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento-San Joaquin Delta” (January 2006 Peer Review Draft Document).

additive effects are expected to be found, so including such a provision in the amendments will add very little to water quality protection. Dr. Felsot also noted that current prevalent levels of OPs also are lower than the range where one would expect additivity.

Dr. Felsot is merely repeating the statements of the authors of the seminal reference cited by Board Staff to support their additivity policy,⁴ a diazinon and chlorpyrifos mixtures paper with *Ceriodaphnia dubia*. At the end of the paper the authors state, "No mortalities were observed in concentrations of mixtures that totalled 0.47 and 0.58 total TUs." In other words, when the concentrations were approximately 25% of the LC50s (i.e., ~0.25 TUs), mortality was not observed. Thus, assuming that all concentrations are additive is not valid when they are below a certain threshold of response.

Poletika and co-workers adapted generally accepted probabilistic ecological risk assessment methods to the question of additive effects of chlorpyrifos and diazinon in Orestimba Creek.⁵ The authors assessed exposure for the combined residues of chlorpyrifos and diazinon by summing the daily measured water concentrations of chlorpyrifos and the toxic equivalent concentrations of diazinon to estimate a total chlorpyrifos equivalent concentration. Total chlorpyrifos equivalent concentrations were computed by first converting each daily diazinon concentration to a chlorpyrifos equivalent by taking the product of the diazinon concentrations and the ratio of the chlorpyrifos and diazinon 10th centile acute lotic (flowing water) species sensitivities, 177/1,142 ng/L. Then each of the resulting daily chlorpyrifos equivalent concentrations was summed with the corresponding reported daily chlorpyrifos concentrations. The percent of time above the 177 ng/L threshold for acute effect events in a full year of observation increased only slightly. In their uncertainty analysis the authors recognized that unequal numbers of different species were tested for chlorpyrifos and diazinon toxicity, and this may bias the additivity calculations because the chlorpyrifos equivalent concentrations were estimated from the 10th centile points on the species sensitivity distribution for each compound. One may conclude from this study that 1) additivity is of little importance in assessing water quality impairments from combined residues of chlorpyrifos and diazinon, and 2) the additivity assumption does not appear to be easily applicable to robust probabilistic methods useful for assessing the impact of individual chemical stressors.

A final point regarding additivity relates to the respective use patterns of the two products. Diazinon is used primarily during the dormant season, while chlorpyrifos use is predominantly non-dormant. Therefore, there is little temporal overlap between most applications and consequently little co-occurrence of residues in water bodies. Analysis of data contained in the DPR surface water monitoring database supports this view.

⁴ Bailey, H.C., Miller, J.L., Miller, M.J., Wiborg, L.C., Deanovic, L., Shed, T. 1997 Joint acute toxicity of diazinon and chlorpyrifos to *Ceriodaphnia dubia*. *Environ Toxicol Chem* 16:2304-2308.

⁵ Poletika, N.N., Woodburn, K.B., Henry, K.S. 2002. An ecological risk assessment for chlorpyrifos in an agriculturally dominated tributary of the San Joaquin River. *Risk Anal* 22:291-308.

6.1.5 Recommended Loading Capacities

Board Staff recommend the Delta Waterways Loading Capacity to be a concentration-based loading capacity that addresses the additive toxicity of diazinon and chlorpyrifos. The recommended equation is the one used in the Basin Plan. In the comments above DAS presented strong evidence that the terms used in the equation, water quality objectives or criteria, are inappropriate, and the levels of chlorpyrifos and diazinon currently found in the waterways do not contribute to additive toxicity. An expert selected by Board Staff for independent peer review made similar comments. Therefore, DAS requests that the concentration-based loading capacity be set for chlorpyrifos and diazinon independently, with no consideration of additive toxicity.

APPENDIX A – PROPERTIES OF THE CALWATER 2.2 DATASET

Websites accessed on 1 Apr 2006.

<http://cain.nbio.gov/calwater/calwfaq.html>

CalWater Frequently Asked Questions -- FAQs

1. Is CalWater a "true" hydrologic dataset, following ridgelines?

CalWater 2.0 and 2.2 are not true hydrologic datasets following ridgelines. However, this is only because the original digital linework used to create these maps was not. The intent of the IWMC is to continue to edit this linework and make it a more accurate reflection of surface water drainage. The role of the IWMC is to guide this process. It is a work in progress.

In late 1995 the USFS, USGS and NRCS presented the IWMC group with the NRCS NI 170-304 standards. The committee agreed to include these guidelines in the CalWater mapping standards, and the three Federal agencies agreed to support this State and Federal interagency mapping effort. An MOU was drafted in March 1997, formalizing this agreement.

However, the current CalWater metadata states:

The California Watershed Map (CalWater version 2.2) is a set of standardized watershed boundaries meeting standardized delineation criteria. The following are subjective comments regarding this data: CalWater boundaries were digitized on a 1:24,000-scale base and thus very accurately divide surface water features depicted on 1:100,000-scale Digital Line Graph hydrography. However, CalWater delineations are primarily designed to be administrative reporting units, and the boundaries should not be used to define authoritative drainage area above a given point as a portion of their definition includes non-physical boundaries, particularly in valley floor and urbanized coastal regions. Attribute completeness is good. Compatibility with existing state and federal watershed delineations is good, except where explicitly different boundary configurations are applied.

Over the last several years many federal and state agencies have realized current 8-digit hydrologic unit (HU) maps are unsatisfactory for many purposes, because of inadequate bases or scales. Because of this, the NRCS has continued to work with other federal and state agencies and with the Subcommittee on Spatial Water Data Federal Geographic Data Committee (FGDC) to establish a Federal interagency standard covering mapping and delineation of hydrologic units that would be suitable for all agencies. In cooperation with the FGDC and the Advisory Committee on Water Information (ACWI), a new interagency guideline has been written. During December of 2000, this document was presented to the FGDC for their review.

Under the new guidelines, hydrologic unit boundaries define the areal extent of surface water drainage to a point. The goal of this initiative is to provide a hydrologically correct, seamless and consistent national Geographic Information System (GIS) database at a scale of 1:24,000, that has been extensively reviewed and matches the USGS topographical 7.5 minute quads. The new levels are called watershed (5th level, 10-digit) and subwatershed (6th level, 12-digit). The watershed level is typically 40,000 to 250,000 acres and subwatershed level is typically 10,000 to 40,000 acres with some as small as 3,000 acres. An estimated 22,000 watersheds and 160,000 subwatersheds will be mapped to the 5th and 6th level. The GIS coverages will be available by the Internet to any person, including federal, state, local government agencies, researchers, private companies, utilities, environmental groups, and

concerned citizens. The database will assist in planning and describing water use and related land use activities.

So in terms of CalWater 2.2, the final answer is that the current data does not meet these standards, but they will soon, through the efforts and guidance of the IWMC, locally held delineation workshops, and the new [National \(FGDC\) Watershed Mapping Standards](#) we develop a more accurate CalWater Version 3.0!

If you are currently trying to work with CalWater 2.2 as the "best available data" please see "[Working with CalWater 2.2](#)" for more information.

<http://cain.nbii.gov/calwater/workcalw22.html>

Understanding and Working with CalWater 2.2

CalWater 2.2 is still the official California Watershed map. It is the best available data for most uses, though it does not, in its present form, meet the Federal Geographic Data Committee's (FGDC) Watershed Boundary Dataset mapping standards. The CalWater committee is working hard to update the watersheds, so that the next version will meet the standards and be hydrologically correct.